PATENT CLAIMS

1.   A method for automatic generation of an envelope that approximates the surface of a design model, available on computer, of a technical system,

in which a meshing of the design model is prescribed that comprises finite elements with nodes, and the method comprises the following steps:

-       determining a cuboid in which the mesh is fully contained,

-       decomposing the cuboid into volume elements with edges that are at most exactly as long as a prescribed bound,

-       checking for each volume element whether the volume element overlaps with at least one finite element of the mesh,

-       determining a body that is formed by the overlapping volume elements,

-       determining those bounding surfaces which bound the body from the outside, and

-       assembling the envelope from the determined bounding surfaces.

2.   The method as claimed in claim 1, characterized in that

-       the cuboid is decomposed such that the shortest edge of each volume element is greater than or equal to the longest edge of each finite element,

-       a decision is made, whenever there is a node of a finite element that lies in a volume element, that the volume element overlaps with the finite element, and

-       a decision is made, whenever no node of a finite element lies in a volume element, that this volume element does not overlap with the finite element.

3.   The method as claimed in claim 1 or claim 2, characterized in that

-       the finite elements of the mesh are rectangles,

-       and the volume elements are cuboids.

4.   The method as claimed in one of claims 1 to 3, characterized in that

-       a wavelength of a harmonic oscillation process is prescribed,

-       use is made as volume elements of cubes whose edge length is a prescribed fraction of the wavelength, and

-      a finite element simulation of the oscillation process is carried out by using the envelope.

5.   The method as claimed in one of claims 1 to 4, characterized in that, when determining the bounding surfaces,

-      those volume elements of the cuboid are determined that form cavities in the interior of the determined body,

-      these cavities are filled, and

-      the bounding surfaces of the solid three-dimensional body thereby produced are determined.

6.   A computer program product that can be loaded directly into the internal memory of a computer and comprises software sections with the aid of which a method as claimed in one of claims 1 to 5 can be executed when the product is running on a computer.

7.   A computer program product that is stored on a computer readable medium and that has computer readable program means that prompt the computer to execute a method as claimed in one of claims 1 to 5.